

# NUDGE - A DAY PLANNER ANDROID APPLICATION USING ARTIFICIAL INTELLIGENCE

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**Abstract—** In this engaged life, people tend to forget scheduling their meetings and events that are very important in their day to day life. They wish to have someone who keeps on prompting them to lineup the work and to make sure that they accomplished the scheduled task on time. The solution to this problem is proposed through an Android Application named “Nudge” using artificial intelligence. This application is built using Android Studio IDE 3.3 released by the Google. The application is used to trigger alarms based on locations, where the user can set a reminder to a location and select a range within which the alarm should be triggered. Once the user move into that range, the alarm goes on. This application is also used to set reminders based on the mails the user receives. Suppose, if a user receives a mail containing any schedule for a meeting or an event, this application will automatically set a reminder to that particular event in the OS calendar. This application also includes facility to directly set a reminder to the OS calendar.

**Keywords**-Location, reminder, alarm, calendar, gmail, date

## I. INTRODUCTION

Scheduling and tracking any event or meeting in our day to day life is becoming a necessary and frequent task today. There are many tasks awaiting to be completed in everyone's life. As android mobile phones are commonly used, a solution for this problem is proposed through an android application. Through mobile applications, tasks, events, meetings in one's life can be scheduled and tracked in an interactive way. This paper involves in the development of a mobile app called Nudge.

Nudge is an android app developed for scheduling and tracking any task, meeting or event of the user. It is used to set location based reminders and also to set reminders in the OS calendar using the information retrieved from the unread messages from gmail that has been synced with the application.

The app is designed for user to select a location and a specific range for the location. When the user moves into that particular range of the specified location, the alarm goes on. Thus the user can be aware of being entered into the range of that location.

The application uses Google maps for selecting the location

and GPS to track the current location of the user. The app also retrieves date from the unread messages from gmail and automatically sets a reminder on that date in the OS calendar of the mobile device. Thus Nudge will save a lot of the user's time.

## II. LITERATURE SURVEY

Global positioning system (GPS) plays an important role as the positioning of the specific location is done by Global Positioning System (GPS) which is a space-based radio navigation system. It is owned by United States government and operated by the United States Air Force. GPS is normally used for positioning of the specific location. The location pointing is done with the help of time and the known position of satellites. These satellites carry atomic clocks that are synchronized with one and other to ground clocks. Moreover, the satellites position is known precisely. The location detection is done by GPS.

The clocks which are attached to the receiver is not synchronized with the true time and are less stable. Since the GPS operates independently, one can use GPS service anywhere and at any time. The position of the user is found by GPS by calculating the difference in the time between the receiver signal and the satellite signal.

The latest technology allows the integration of GPS with smart phones. Hence it is very easy to get the exact location of the user via the smart phone. In the Android platform there is a class named Location Manager which is used for finding the location of the user. It specifies the location in terms of latitude and longitude. The Location Listener interface in android is used for receiving the notifications from the Location Manager. Normally the notifications are received when the location changes. When the location is changed, the on Location Changed method gets called and the specified action can be done. By this, location of the user can be received in terms of latitude and longitude by the app.

Using GPS will normally increase the accuracy and reliability when the masking angles are high. The application also uses Notification Handler class to send notification to the user. This Notification Handler is used to pin a notification onto the

notification bar to indicate that the application runs services in the background. Another web mapping service which provides the customer – service provider based services is Google Maps. Google Map shows all the available services which are near to the customer.

One of the most commonly used medium for reminder is the mobile phone assistants such as Google Assistant, Siri, Alexa, etc. The services are made available as a built in feature in the mobiles or as a device featured assistant. There are also other android applications that are used to set reminders. These reminder applications require a date and a time to set the reminder and most rarely requires a note or a label for the reminder. When the user wants to set any reminder, he either uses the reminder application or he vocally gives the date and time to the mobile assistant.

The disadvantage of using the reminder application is that, it is very typical. It cannot be used to set reminders based on any other data other than date and time. The notification of the alarms by the mobile assistants are not so interactive, moreover the alarms the unseen.

### III. SYSTEM ARCHITECTURE

The system providing reminder services uses android in the foreground with the background services written using SQLite database. The block diagram of the system architecture is depicted in Fig. 3.1.

The location of the user is detected with the help of GPS. The application has two functional modules, one is for the location based alarm and the other is to set the reminder to the OS calendar either directly or by syncing the gmail with the application. In the location based alarm module, when the user creates a new location based alarm the application uses the firebase to load the Google maps. The user selects the location, range and many other additional information needed for the reminder. The application converts the location into latitude and longitude format and stores all the information provided by the user into the SQLite database in the table format. Now this module lets the service run in the background and continuously checks for the current location and the destined location. Once the user moves into the specified range of the location, the alarm goes on.

In the Gmail based alarm module, the user syncs his gmail account to the Nudge application and the OS calendar in the mobile phone.

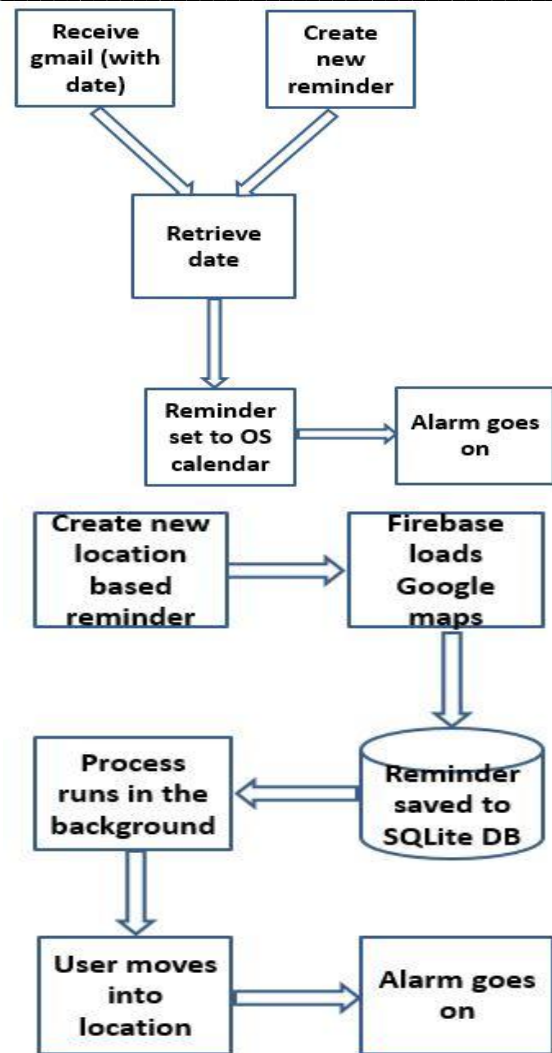


Fig. 3.1 System Architecture

If the user receive any mail having a date for any meeting or event and particularly the mail is unread, the Nudge application retrieves the date and sets the reminder to the OS calendar. The user can also directly set reminder to the OS calendar by selecting the create reminder option and select the desired date.

### IV. DESIGN AND IMPLEMENTATION

The reminder application Nudge can be deployed in android mobile phones to schedule and track the tasks, meetings or events. It is built containing two mobile app modules which are briefed as follows.

#### A. Location based alarm

This module includes four activities or pages from the

Nudge application. The first activity which is also the home page of the application displays the list of all location based alarms, active and pending tasks inclusive. It has a dashboard and a add task button on it as shown in the Fig. 4.1. It also has a switch button to ensure that the application is allowed run services in the background.

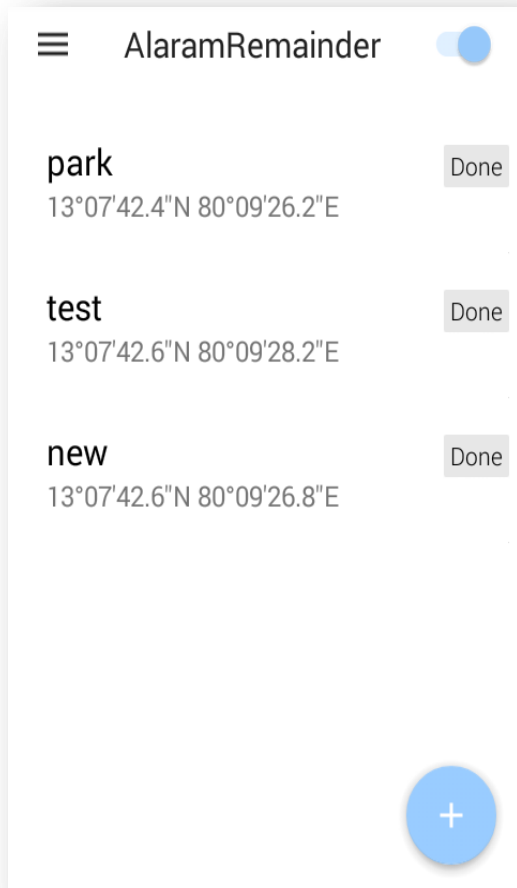


Fig. 4.1. Home Page

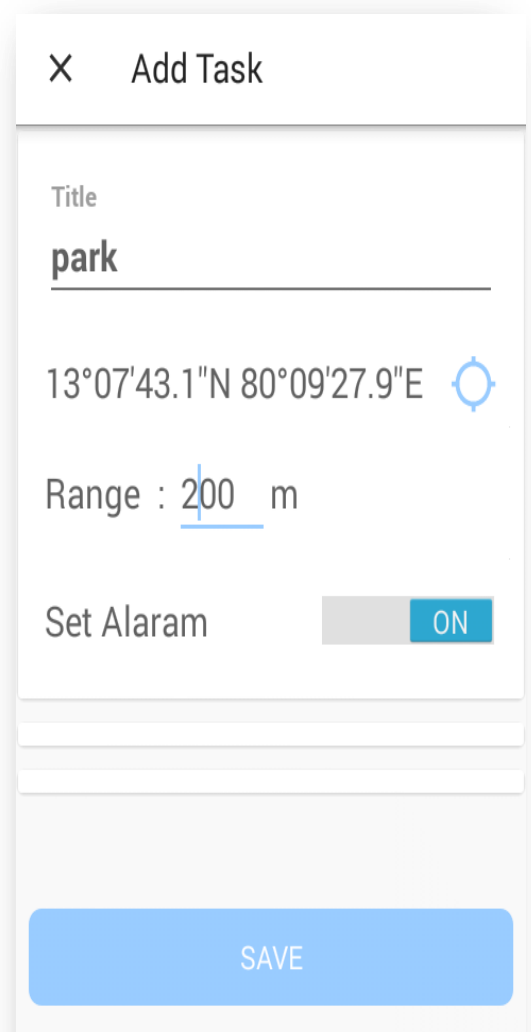


Fig. 4.2. Add Task

By clicking the add task button opens the add task activity, where the user can select the location, range and the additional information to the reminder. This page has a save button to save the details of the reminder in the SQLite database. It has a facility to select whether to trigger alarm or simply vibrate the mobile phone and many other facilities like adding a note and image to the reminder which will be displayed while triggering the alarm. It also allows to select the time duration and repeat mode of the reminder. It is shown in the Fig. 4.2.

While selecting the location the Nudge application uses Firebase json file to load the Google maps. The map pops up over the activity and allows the user to select the location from the map and also provides a list of popular places around the location from which the user can easily select the desired location just by clicking it. The Google maps page is shown in the Fig 4.3.

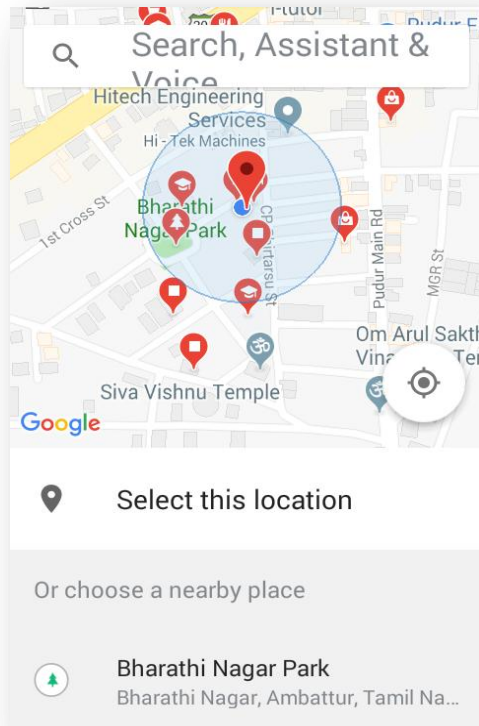


Fig. 4.3. Google map

Now, the reminder is set. The goal is to trigger the alarm when the user moves into the specified range of the destined location. To accomplish this task, the Nudge application continuously compares the user's current location (mobile's location using GPS) with the destined location. When the location difference lies within the specified range, the alarm goes on as shown in Fig.4.4.

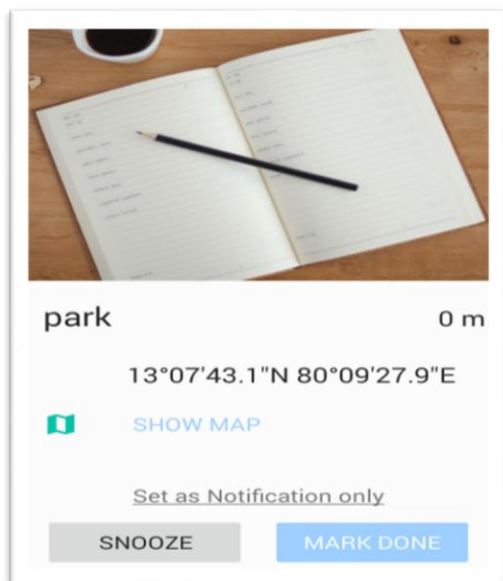


Fig. 4.4. Alarm

Once the alarm goes on, there are two options given to the user. The user can either mark the reminder as done so that the status of the reminder is marked as done and the reminder is not repeated or the user can snooze or postpone the reminder for a few minutes. The facility to change the snooze timing, alarm tone, default range, etc. are given in the settings activity in the dashboard activity as shown in Fig. 4.5.

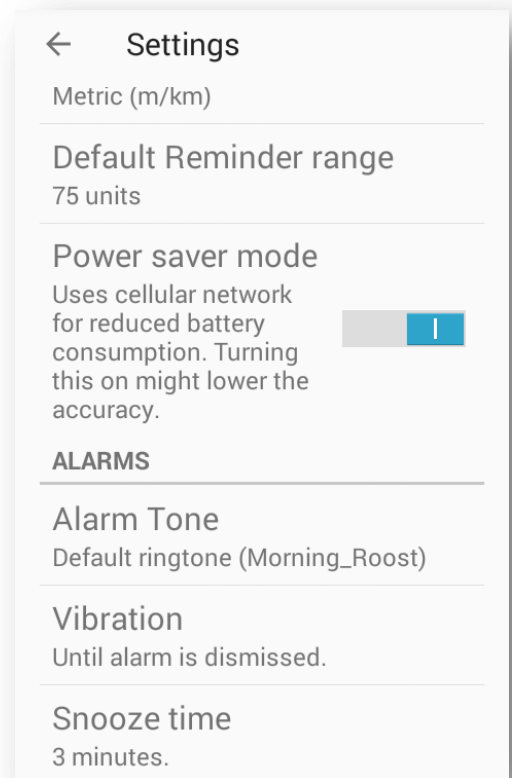


Fig. 4.5. Settings

There is an option called power saver mode in the settings activity. If this option is enabled, then the amount of battery consumption is reduced as much as possible which may affect the accuracy of the GPS. If this option is disabled, then the accuracy of the GPS is high but it requires more battery power from the device.

#### B. Gmail based alarm

This module is used to automatically set a reminder to the OS calendar of the mobile based on the gmail received by the user. First step is to sync the user's gmail account to the OS calendar and the Nudge application. To sync the user's gmail with the Nudge application, the user has to login the user's gmail account in to the Nudge application as shown in Fig. 4.6. Secondly, if the user receive any mail that contains a date in its subject, then this application retrieves the date from the mail's subject using the Natural Language Processing

technique (NLP). Natural language processing (NLP) is the ability of a computer program to understand human language as it is spoken. NLP is a component of artificial intelligence (AI).

The Nudge application retrieves the date from the mail using NLP only if the mail is unread. This application takes the date alone from complete date retrieved from the mail and sets a reminder to the OS calendar of the current month and current year only. This kind of technique is used for feasibility and efficiency purpose.

Fig. 4.6. Gmail sync

Once the gmail is synced with the Nudge application, the application runs the services in the background. These background services regularly checks for unread messages in the synced gmail account, if there are any unread messages present in the gmail account, then this application reads the subject of the mail. If there is any date present in the subject of the unread mail, then the Nudge application uses the NLP to retrieve the date from the mail. This action is done by teaching the application about the date format using an example. Then, a reminder is set to the OS calendar in the date retrieved from the mail of the current month and current year.

The services regularly read the subject of the unread messages because reading the mail every time can create

an overhead to the application. A sample gmail message is shown in Fig. 4.7.

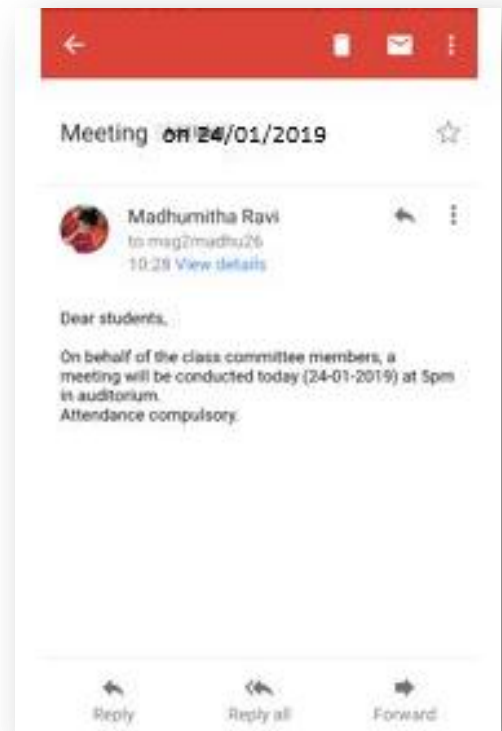


Fig. 4.7. Gmail

The OS calendar to which the reminder is set by the Nudge application is shown in Fig. 4.8.

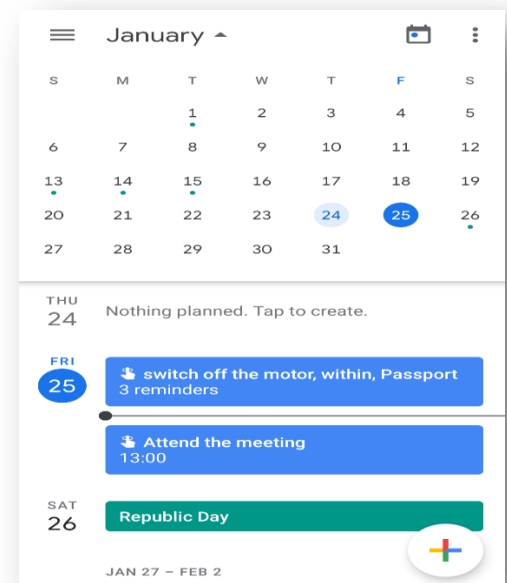


Fig. 4.8. OS calendar



The Nudge application also provides additional facility in which we can directly set a reminder to the OS calendar. To do so, the user has to click on the create alarm option in the dashboard. The create alarm activity opens up. In this activity, there are provisions which prompts for the year, month, day, hour and minute to which the reminder should be set. On clicking the create button, the reminder is set to the OS calendar as shown in *Fig. 4.9*.

Fig. 4.9. Create alarm

#### IV. CONCLUSION

The application “Nudge” uses GPS to locate the user’s mobile phone. The application allows the user to trigger alarm based on locations. These location based reminders are saved to the SQLite database. While initiating the reminder, the user should provide the range within which the alarm should go on. Once the user moves into the specified range of the location, the alarm goes on. The application also allows the user to sync his gmail account to the application. By doing so, if the user receives any mail which contains a date in its subjects

and the mail is left unread, then the Nudge application retrieves the date from the mail and sets a reminder to the OS calendar of the mobile phone.

The application also allows the user to set a reminder to the OS calendar by providing the date details directly. Thus, this application saves a lot of user’s time and helps the user to schedule and task the user’s daily events or meetings and also ensures that the task is accomplished on time. The future work which are being prepared are to make this application to analyze the user’s character based on the user’s reminders and hence can suggest the user in making useful decisions.

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